

ABSTRACT OF THE DISCLOSURE

The use of Al-5083 in a wide range of applications has been an industrial constant for many years. It possesses an excellent balance of properties, including high strength, good weldability, light weight and low cost. One of the commonly perceived drawbacks of the use of 5083 has been concern over susceptibility to stress corrosion cracking (SCC) and subsequent failure while in service. In the present invention, the susceptibility of high-magnesium Al-Mg alloys to SCC was evaluated with an eye toward altering SCC characteristics through compositional changes. These alloy composition changes are comprised of minor additions of Zn and Cu, in levels that are preferably low enough to minimize changes to the favorable bulk properties already inherent to Al-5083. Additionally, in accordance with the present invention, established industrial practices for material processing have been mimicked in order to evaluate the effects on inventive alloys in what would essentially be considered an as-supplied state. It has been shown that in tests on alloys subjected to an extreme degree of sensitization, and pulled to failure while immersed in a saltwater environment, compositions of the present invention provide a situation whereby potentially harmful grain boundary phase corrosion and failure is mitigated by the presence of various additions of copper.